

**STATE UNIVERSITY OF NEW YORK  
COLLEGE OF TECHNOLOGY  
CANTON, NEW YORK**



**MASTER SYLLABUS**

**GMMD 351 3D Animation**

**Created by: Kathleen Mahoney  
Updated by: Kathleen Mahoney**

**CANINO SCHOOL OF ENGINEERING TECHNOLOGY  
GRAPHIC AND MULTIMEDIA DESIGN  
FALL 2018**

- A. **TITLE:** 3D Animation
- B. **COURSE NUMBER:** GMMD 351
- C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

# Credit Hours: 3  
 # Lecture Hours: 3 per week  
 # Lab Hours: per week  
 Other: per week

Course Length: 15 Weeks

D. **WRITING INTENSIVE COURSE:** No

E. **GER CATEGORY:**

F. **SEMESTER(S) OFFERED:** Spring

G. **COURSE DESCRIPTION:**

This course is an overview of the techniques and history 3D animation, including character design, modeling, storyboarding, rigging and animating a scene. Students engage in hands-on projects involving the development of hand-drawn and computer-generated animation. Emphasis is placed on understanding the place of animation in the context of the film, television, internet, and gaming industries, project management, and the development of a personal animation style.

H. **PRE-REQUISITES/CO-REQUISITES:**

- a. Pre-requisite(s): GMMD 102 and GMMD 200
- b. Co-requisite(s):
- c. Pre- or co-requisite(s):

I. **STUDENT LEARNING OUTCOMES:**

<b><u>Course Student Learning Outcome</u></b> <b><u>[SLO]</u></b>	<b><u>PSLO</u></b>	<b><u>GER</u></b>	<b><u>ISLO</u></b>
Integrate theories of narrative, immersion, and character development with analysis of animated products.	<b>PSLO 1</b> Student assessment addresses composition, form, function, and design.		5
Assess current trends in animation production.	<b>PSLO 4</b> Public display of student work demonstrates attention to professional detail.		2 [CA][IA] [PS]
Compare the immersive qualities of various techniques of animation.	<b>PSLO 6</b> Student documentation demonstrates awareness of design process (brainstorming, research, problem definition, finalization).		2 [CA][IA] [PS]
Develop a series of animated characters.	<b>PSLO 5</b> Public display of student work demonstrates an ability to clearly articulate the purpose of the design to the audience.		1 [O, W]

Design and create a variety of animated projects, culminating in a finalized animated short.	<b>PSLO 5</b> Public display of student work demonstrates an ability to clearly articulate the purpose of the design to the audience.		1 [O, W]
Evaluate student-and professionally-produced multimedia products.	<b>PSLO 2</b> Student design brief or contract demonstrates clear intention of purpose and criteria for assessment.		1 [O, W]

<b>KEY</b>	<b><u>Institutional Student Learning Outcomes [ISLO 1 – 5]</u></b>
<b>ISLO #</b>	<b>ISLO &amp; Subsets</b>
<b>1</b>	<b>Communication Skills</b> Oral [O], Written [W]
<b>2</b>	<b>Critical Thinking</b> <i>Critical Analysis [CA] , Inquiry &amp; Analysis [IA] , Problem Solving [PS]</i>
<b>3</b>	<b>Foundational Skills</b> <i>Information Management [IM], Quantitative Lit./Reasoning [QTR]</i>
<b>4</b>	<b>Social Responsibility</b> <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i>
<b>5</b>	<b>Industry, Professional, Discipline Specific Knowledge and Skills</b>

J. **APPLIED LEARNING COMPONENT:** Yes   X   No       

K. **TEXTS:**  
**Introducing Autodesk Maya 2016: Autodesk Official Press**  
 By Dariush Derakhshani  
 ISBN-13: 978-1119059639  
 ISBN-10: 1119059631

L. **REFERENCES:**

M. **EQUIPMENT:**

N. **GRADING METHOD:** A-F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

- Exams
- Quizzes
- Character studies
- Motion study
- Animated short
- Historical research/emulation project
- Papers

- Participation

**P. DETAILED COURSE OUTLINE:**

**I. Introduction to Computer Graphics and 3D**

- A. 3D Computer Graphics
- B. The Stages of Production
- C. Basic Film Concepts

**II. User Interface**

- A. Preproduction Process
- B. Production Process
- C. Hierarchy and Object Structure

**III. The Autodesk Maya Interface**

- A. Navigating in Maya
- B. Exploring the Maya Layout
- C. Mapping Reference Planes

**IV. Beginning Polygonal Modeling**

- A. Polygon Basics
- B. Polygon Editing Tools
- C. Polygon Mesh

**V. Modeling with NURBs**

- A. Using NURB surfacing
- B. Patch Modeling
- C. The Lattice Deformer

**VI. Practical Modeling**

- A. Modeling an Object

**VII. Shading and Texturing**

- A. Shader Types
- B. Shader Attributes
- C. Textures and Surfaces

**VIII. Introduction to Animation**

- A. Keyframe Animation
- B. Replacing an Object

**IX. Animation Kinematics**

- A. Skeletons and Kinematics
- B. Basic Kinematic Relationships
- C. Character Rigging

**X. Lighting**

- A. Ray Tracing
- B. Mental Ray
- C. Lighting Effects

**XI. Rendering**

- A. Reflections and Refractions
- B. Using Cameras
- C. Ambient Occlusion

**XII. Dynamics and Effects**

- A. Dynamics Overview
- B. Rigid body and Soft Dynamics
- C. Particle Effects

**Q. LABORATORY OUTLINE:**

- 1. Gain a working understanding of the user interface**
  - a. How to navigate in 3D space
  - b. Learn project structure in Maya and how to create projects
- 2. Recognize and use Maya UI Elements**
  - a. Maya view panels and windows
  - b. Transforming objects in 3D space
  - c. Polygon modeling techniques
- 3. Planning Better Models**
  - a. Editing polygon geometry
  - b. Modeling Toolkit Interface
- 4. Beginning Polygonal Modeling**
  - a. Polygon Editing Tools
  - b. Polygon Mesh
- 5. Use surface techniques: Loft, Set Planar, Revolve**
  - a. Convert NURBS geometry
  - b. Create polygon meshes
- 6. Manipulating curves to create poly meshes with Revolve Surface**
  - a. Create a shape with path extrusions
  - b. Work in Hypershade to assign image maps to objects in the scene
- 7. Working with Shaders**
  - a. Create and edit shader networks in the Hypershade window
- 8. Introduction to Animation**
  - a. Setting keyframes
  - b. Working with principles of squash, stretch, anticipation and follow-through
- 9. Animation Kinematics**
  - a. Creating and manipulating a skeleton
  - b. Creating a walk cycle
  - c. Rig a simple character for animating
- 10. Lighting**
  - a. Analyze light attributes and choose appropriate light for a scene
  - b. Create mood and realism with shadow maps
- 11. Setting Up a Scene for Output through Rendering**
  - a. Choosing resolution and other settings
  - b. Working with mental ray
  - c. Applying a displacement map
- 12. Creating Dynamics and Effects**
  - a. Keyframe animated passive rigid body objects
  - b. Rendering an object and a scene